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Division of Fishes

Our attention was first called to the possibility that a systematic problem might exist within the monotypic blenniid genus *Atrosalarias* because Chapman (1951) had reported that the dorsal fin had 10 spines and Smith (1959) had reported that it had 11 spines. Our purposes here are to redefine *Atrosalarias* and to discuss the meristic variation and geographic distribution of the genus. We have attempted to examine all extant material and to give a complete synonymy at least through 1964 (three references, each marked with an asterisk, were not seen). The synonymy is not given separately for each of the two subspecies that we recognize under *A. fuscus* because several authors refer to material that comprise both subspecies or because it was impossible to determine which of the two subspecies the authors were considering. Of the five nominal species referable to *Atrosalarias*, four are *A. fuscus fuscus*. *Salarias holomelas* is considered a subspecies, *A. fuscus holomelas*.

We wish to thank the following institutions and personnel for making available to us the facilities of their collections (abbreviations are those used in the material list): Academy of Natural Sciences of Philadelphia (ANSP), J. E. Böhlke; Australian Museum, Sydney

(AMS), F. H. Talbot and S. Beresford; California Academy of Sciences (CAS), W. I. Follett and W. N. Eschmeyer; British Museum (Natural History) (BMNH), P. H. Greenwood and A. C. Wheeler; Field Museum of Natural History (FMNH), L. P. Woods and P. Sonoda; Hebrew University, Israel (HUI), H. Steinitz; Institut Royal des Sciences Naturelles de Belgique (IRSN), J. P. Gosse; Los Angeles County Museum (LACM), D. K. Caldwell and R. J. Lavenberg; Museo Civico de Storia Naturale (MCSN), E. Tortonese; Naturhistorisches Museum, Wien (NMW), P. Kähsbauer; Queensland Museum, Brisbane (QMB), B. Campbell; Rijksmuseum van Natuurlijke Historie, Leiden (RNH), M. Boeseman; Natur-Museum und Forschungs-Institut Senckenberg (SMF), W. Klausewitz; Division of Systematic Biology, Stanford University (SU), W. C. Freihofer and G. S. Myers; University of Hawaii (UH), W. A. Gosline and R. H. Snider; University of Michigan, Museum of Zoology (UMMZ), R. M. Bailey; United States National Museum (USNM); University of Washington (UW), R. Van Cleave; Western Australian Museum (WAM), R. McKay; Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg (ZSZM), K. Kosswig and W. Ladiges.

For assistance in the field we are much indebted to J. H. Choat of the University of Queensland, P. Woodhead of the Heron Island Marine Laboratory, and several members of the staff of the Australian Museum. Fanny L. Phillips of the U.S. National Museum executed the illustration. Our colleagues, B. B. Collette and R. H. Gibbs, Jr., critically read the manuscript and offered valuable suggestions for its improvement. Field work for this study was supported by a grant from the Tropical Fish Hobbyist Fund. Other aspects of the research were supported by a grant from the Smithsonian Research Foundation.

Atrosalarias Whitley

Atrosalarias Whitley, 1933, Rec. Australian Mus., vol. 19, p. 93 [type-species: *Salarias phaiosoma* Bleeker, by original designation].—Norman, 1944, Draft synopsis of the orders, families and genera of recent fishes and fish-like vertebrates, p. 451 [synonym of *Salarias*].—Schultz and Chapman, 1960, U.S. Nat. Mus. Bull. 202, pt. 2, p. 304 [in key].—Springer, 1966, Copeia, no. 1, p. 59 [nature of interopercle].

Atrosalarias fuscus (Rüppell)

PLATE 1

Salarias fuscus Rüppell, 1835, Neue Wirbel. Faun. Abyssin., Fische Roth. Meer., vol. 1, pt. 4, p. 135 [Massaua; original description; figured].—Günther, 1861, Catalogue Acanthopterygian fishes, vol. 3, p. 245 [synonymy; description; distribution].—Bleeker, 1865a, Ned. Tijdschr. Dierk., vol. 2, p. 191 [Piru; Wahai; *S. phaiosoma* Bleeker a synonym]; 1865b, ibid, p. 293 [Amboina].—Day, 1870, Proc. Zool. Soc. London, p. 695 [Nicobars].—Klunzinger, 1871,

Verh. Zool.-Bot. Ges. Wien, vol. 21, p. 489 [Red Sea; description].—Günther, 1877, Journ. Mus. Godeffroy, vol. 13, p. 202 [Pelew; Vavau; distribution; synonymy; description; figured].—Day, 1878, Fishes of India, vol. 2, p. 330 [Kurrachee, India; description; distribution; figured]; 1888, ibid., suppl., p. 797 [synonymy]; 1889, Fauna of British India, vol. 2, p. 311, 313, 314 [key; description; distribution].—Pellegrin, 1904, Bull. Mus. Hist. Nat. Paris, vol. 10, no. 8, p. 543 [Djibouti].—Borsieri, 1904, Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 1, no. 41, p. 209 [Massaua; Daalac].—Weber, 1913, Fische Siboga Expedition, p. 530, 632 [Beo; synonymy; distribution; reefs].—McCulloch and McNeill, 1918, Rec. Australian Mus., vol. 12, no. 2, p. 12 [Murray Is.; Masthead Is.; Sind, India; Friendly Is.; New Hebrides; synonymy; description].—Fowler, 1918, Copeia, no. 58, p. 65 [Philippines]; 1927, Proc. Acad. Nat. Sci. Philadelphia, vol. 79, p. 295 [misidentification in part; Philippines]; 1928, Mem. Bernice P. Bishop Mus., vol. 10, p. 435 [synonymy; description; distribution].—McCulloch, 1929, Mem. Australian Mus., no. 5, p. 343 [distribution].—Fowler, 1931, Mem. Bernice P. Bishop Mus., vol. 11, no. 5, p. 363 [Oceania]; 1932, Occas. Pap. Bishop Mus., vol. 9, no. 20, p. 12 [Suva, Fiji]; 1934, Mem. Bernice P. Bishop Mus., vol. 11, no. 6, p. 445 [Friendly Is.].—Herre, 1935, Journ. Pan-Pacific Res. Inst., vol. 10, no. 2, p. 166 [Pelew Is.].—Abe, 1939, Japan Soc. Promot. Sci. Res., p. 574 [Koror; distribution].—Herre, 1939a, Philippine Journ. Sci., vol. 70, no. 4, pp. 348–349 [Jolo; Sibutu; Sitankai; synonymy; description]; 1939b, Rec. Indian Mus., vol. 41, no. 4, pl. 361 [synonymy; description; distribution].—Fowler, 1940, Proc. American Philos. Soc., vol. 85, no. 5, p. 796 [Fiji].—Aoyagi, 1941, Sci. South Seas, vol. 4, no. 1, p. 61 [in Japanese; Palau Is.].—Herre, 1942, Proc. Biol. Soc. Washington, vol. 55, no. 1, p. 3 [Philippines].—Norman, 1943, Ann. Mag. Nat. Hist., ser. 11, vol. 10, p. 811 [listed].—Fowler, 1944, Proc. Acad. Nat. Sci. Philadelphia, vol. 96, p. 198 [New Hebrides].—Smith, 1949, Sea fishes of southern Africa, p. 348 [description; Natal record possible error].—Aoyagi, 1954, Zool. Mag. Tokyo, vol. 63, p. 280 [Okinawa; Honto; Niyako Is.; Ishagaki Is.; Irimote Is.; figured].—Munro, 1958, Papua New Guinea Agric. Journ., vol. 10, no. 4, p. 250 [listed].—Fowler, 1959, Fishes of Fiji, p. 520 [distribution; description; figured].—Marshall, 1964, Fishes Great Barrier Reef, p. 389 [Queensland].

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Erpicthys ruficauda —Swainson, 1839, Natural history of fishes, amphibians and reptiles, vol. 2, p 275 [listed]

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Salarias holomelas Günther, 1872, Ann. Mag. Nat. Hist., ser. 4, vol. 10, p. 399 [Cebu; original description].—Schmeltz, 1877*, Cat. Mus. Godeffroy, vol. 6, p. 15 [Pelew Is.]; 1879*, Cat. Mus. Godeffroy, vol. 7, p. 49 [Pelew Is.].—Pöhl, 1884*, Cat. Mus. Godeffroy, vol. 9, p. 34 [Pelew Is.].—Meyer, 1885, Ann. Soc. España Hist. Nat., Madrid, vol. 14, pp. 6, 13 [Cebu].—Jordan and Seale, 1906, U.S. Bur. Fish. Bull., no. 25, p. 431 [synonymy].—Herre, 1934, Fishes of the Herre Philippine expedition 1931, p. 97 (Jolo; Sitankai).

Salarias niger Kossmann and Räuber *in* Kossmann, 1877, Zool. Ergebn. Auftr. König. Acad. Wiss. Berlin ausgefuh. Reise Küsten. Rothen Meeres. Pisces. p. 21 [Massaua; original description; figured].

Atrosalarias phaisoma.—Whitley, 1933, Rec. Australian Mus., vol. 19, p. 93 [*S. phaisoma* designated type-species of *Atrosalarias* Whitley; distribution].

Atrosalarias fuscus.—Catala, 1950, Bull. Biol. Paris, pp. 274, 302 [New Caledonia; habitat].—Chapman, 1951, *in* Beaufort, Fishes Indo-Australian Archipelago, vol. 9, pp. 255–257 [synonymy; description; distribution; figured].—Herre, 1953, U.S. Dept. Interior, Fish and Wildl. Serv. Res. Rep., no. 20, pp. 809–810 [synonymy].—Fowler, 1958, Quart. Journ. Taiwan Mus., vol. 11, nos. 3 and 4, pp. 176–177 [synonymy; description; distribution].—Inger, 1957, Fieldiana, Zool., vol. 36, no. 3, p. 399 [Pulo Bakkungaan Kechil, Borneo].—Okada, 1959, An annotated list of animals of Okinawa Islands, p. 80 [in Japanese; listed].—Smith, 1959, Rhodes Univ., Ichthyol. Bull., no. 14, p. 239 [Ibo, Mozambique; description; figured].—Whitley, 1961, Proc. Zool. Soc. New South Wales, 1958–59, p. 64 [New Caledonia].—Woodland and Slack-Smith, 1963, Univ. Queensland Pap., Dept. Zool., vol. 2, no. 2, p. 47 [Heron Is.; habitat].—Whitley, 1964, Rec. Australian Mus., vol. 26, no. 5, p. 150 [Swains Reefs].—Tortonese, 1964, Ann. Mus. Civ. Stor. Nat. Genova, vol. 75, p. 65 [Baia di Geelwink, New Guinea].

DESCRIPTION.—Dorsal fin rays IX to XI, 18 to 22, total elements 28 to 32, subposterior rays longest, posteriormost ray shortest, fin membrane behind last ray attached over caudal procurrent rays; anal fin rays II, 18 to 21 (one specimen of 224 had 16 rays), terminal ray not divided to base, subposterior rays longest, posteriormost ray shortest, fin membrane behind last ray attached at caudal base; pectoral rays 15 to 18 (usually 16 or 17) on each side, total pectoral rays 30 to 36; pelvic rays I, 2; segmented caudal rays 10 to 14 (usually 12 or 13), rays all simple, uppermost and lowermost rays much reduced and frequently bearing only one or two segments, all rays unbranched, ray tips becoming free in large individuals; pseudobranchial filaments 7 to 12 (usually 8 to 11); gill-rakers on first arch 22 to 35 (usually 26 to 31); vertebrae 10 + 22 to 26 = 32 to 36 (usually 34 or 35); total premaxillary comblike teeth 135 to 226; total dentary comblike teeth 82 to 147, one very small canine on each side posterior to comblike teeth; no teeth on vomer.

Short, simple cirri on each side of nape (nape cirri rarely forked at tip), above each eye, and on posterior rim of each anterior nostril; upper lip irregularly crenulate; circumorbital, preoperculomandibular, prenasal, and lateral line pores in simple series; one pore in midline before dorsal fin; lateral line a continuous tube ending above pectoral fin; isolated porelike depressions sometimes present along midside of body.

OSTEOLOGY (based primarily on one specimen of each subspecies).—Last dorsal ray supported by distal and proximal pterygiophores; last anal ray supported by proximal pterygiophore, with or without distal pterygiophore; dorsal procurrent caudal rays 5 or 6, ventral procurrent

rays 5; 2 epurals present, no minimal hypural (=posteriormost epural of Springer, 1966; hypural 5 of Nybelin, 1963); one pectoral radial attached to scapula, one in part to scapula and coracoid, and two to coracoid; two well-developed postcleithra on each side; lateral line tube passing through supracleithrum; post-temporal forked, ventral limb attached by ligament to pterotic (no attachment to intercalar); lateral extrascapular present on each side; 5 weak circumorbitals (including lachrymal and dermosphenotic) on each side; no subocular shelf; ascending wings of parasphenoid meet descending wings of frontals to exclude pterosphenoids and prootics from orbital region; belophragm and meningost portions of basisphenoid present (basisphenoid complete; for discussion of the composition of the basisphenoid, see Chabanaud, 1936); 13 to 15 epipleurals on each side; one pleural attached to parapophysis on each side of third through tenth or eleventh vertebrae; no neural spine on first vertebra; low neural spine on second vertebra; well-developed neural spines on all other vertebrae; conspicuous neural arch processes on third and fourth vertebrae only (processes attach by strong ligaments to third and fourth pair of epipleurals); parapophysial stays (haemal arches without spines) on eighth through tenth vertebrae; first haemal spine on eleventh vertebra.

Preserved coloration (ethyl alcohol).—Body, head, and fins, except pectorals and caudal, mostly brown to black; dorsal fin most intensely black basally over anterior three spines; pectorals clear to light dusky with dark spot at base of upper rays; caudal clear to dark dusky; occasional variants exhibit up to five irregular dark bands on body separated by paler interspaces.

The caudal fin has been described in the literature as ranging from clear to dark. Most specimens exhibit a dark dusky caudal, but occasional specimens with pale (immaculate) caudals are found in collections of specimens where dusky caudals predominate. Specimens from the Great Barrier Reef usually have immaculate caudals.

Life coloration (based on specimens from One Tree Island, Great Barrier Reef).—Caudal fin bright yellow orange, pectorals yellow; deep amber submarginal stripe in spinous dorsal; color otherwise black.

Size.—Specimens examined ranged in size from 16.8 to 105 mm SL. No ophioblennius larvae were represented in our collections. Some males were noted to have the skin over the anal spines and anterior two or three anal rays rugose. It is presumed, as for *Entomacrodus* (see Springer, 1967), that these were mature specimens. In females, as is typical of blenniids, the first anal spine is not visible externally.

MERISTIC VARIATION (table 1).—Specimens with 11 dorsal spines are restricted predominantly to Indian Ocean localities, where all specimens except the one from western Australia (9 spines) had that number. The 9-spined specimen from western Australia probably indicates that the population from that area is more closely related to Pacific Ocean populations, where specimens with 9 or 10 spines predominate. Only 4 of 176 non-Indian Ocean specimens had 11 spines. It is on the basis of dorsal spine count associated with distribution that we recognize two subspecies of *A. fuscus*. Springer (1967) noted a similar distribution pattern for *Entomacrodus decussatus* (Bleeker), found in western Australia but otherwise distributed only in the Pacific Ocean and adjacent inland seas, with a cognate species found only in the Indian Ocean, exclusive of western Australia.

Specimens with 11 dorsal spines had about the same total number of dorsal elements as those with 9 or 10 spines, indicating that the decrease in spine numbers probably is effected by conversion of spines to rays rather than by increasing the number of rays. Such a conversion probably is not a simple matter, as there is a relatively complex relationship between the posteriormost spine and anteriormost ray. Each dorsal element except these two is associated with its own proximal pterygiophore; the two elements in question are associated with a single, common, proximal pterygiophore. It is of interest here, however, that one Australian specimen exhibited a somewhat malformed, segmented element in the position where a normal spine should have occurred. The segmented portion occurred distal to a point where the element apparently had been injured. This element exhibited a normal spinelike attachment (no distal pterygiophore) to its proximal pterygiophore (all rays, and no spines, normally have distal pterygiophores) and was counted as a spine.

Fin elements and vertebral numbers are generally highest in the northern Australian (Gulf of Carpentaria) population. This population showed higher total pectoral ray counts than the other populations. No other blenniid so far has been demonstrated to have a population varying from all others in pectoral ray count. It is important to note that, while the eastern Australian specimens had the typical number of pectoral and anal rays for the species, they and the northern Australian population shared the highest average vertebral counts, indicating that pectoral ray and anal ray counts are independent of vertebral count.

Upper and lower jaw tooth counts were made on 20 specimens, 16.8 to 105 mm standard length. The upper teeth ranged from 135 to 226, and the lower teeth ranged from 82 to 147, excluding the canines. The correlation coefficient for both the number of upper jaw teeth,

TABLE 1.—*Frequency distributions for certain meristic characters in subspecies of* Atrosalarias fuscus

	Dorsal spines			Dorsal rays					Total dorsal elements					Anal rays						Total pectoral rays							Vertebrae				
	9	10	11	18	19	20	21	22	28	29	30	21	32	16	17	18	19	20	21	30	31	32	33	34	35	36	32	33	34	35	36
A. f. fuscus																															
Red Sea	–	–	16	7	7	2	–	–	–	7	7	2	–	–	–	6	8	2	–	1	2	12	1	–	–	–	–	3	11	2	–
India	–	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	1	–	–
Zanzibar	–	–	1	1	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–
Indonesia	–	–	7	–	7	–	–	–	–	–	7	–	–	–	–	–	7	–	–	–	–	7	–	–	–	–	–	–	7	–	–
A. f. holomelas																															
S. China Sea	–	1	–	–	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–
N. Borneo	–	18	2	–	10	10	–	–	–	8	12	–	–	–	–	6	13	–	–	–	–	15	3	2	–	–	–	2	11	4	–
Cebu	–	1	–	–	–	–	1	–	–	–	–	1	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	1	–
Palau Is.	–	15	–	–	4	11	–	–	–	4	11	–	–	–	–	1	12	2	–	–	1	12	1	1	–	–	–	–	5	–	–
Timor	–	1	–	–	1	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	1	–	–
Banda Sea	–	15	1	–	8	8	–	–	–	7	9	–	–	–	–	3	10	–	–	–	–	9	1	4	–	–	–	2	12	–	–
New Guinea	–	1	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	1	–	–
New Britain	–	1	1	1	1	–	–	–	–	2	–	–	–	–	–	2	–	–	–	–	–	2	–	–	–	–	–	–	2	–	–
Solomon Is.	–	12	–	1	6	4	–	–	1	6	4	–	–	–	–	6	4	–	–	1	1	10	–	–	–	–	–	4	6	1	–
N. Australia	–	27	–	–	1	11	14	1	–	1	9	16	1	–	–	–	2	23	2	–	–	6	2	17	1	1	–	–	5	17	1
W. Australia	1	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	1	–	–
E. Australia	5	74	–	1	4	52	18	4	1	4	56	17	1	–	–	11	54	13	–	1	12	60	5	1	–	–	–	–	18	56	1
New Hebrides	–	13	–	1	8	3	–	–	1	8	3	–	–	1	–	6	6	–	–	1	1	11	–	–	–	–	1	1	8	1	–
New Caledonia	–	1	–	–	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–
Fiji Is.	–	10	–	–	–	8	2	–	–	–	8	2	–	–	–	–	5	5	–	1	2	7	–	–	–	–	–	–	3	6	–
Tonga Is.	–	3	–	–	–	–	3	–	–	–	–	3	–	–	–	–	–	3	–	–	–	3	–	–	–	–	–	–	–	3	–
Tahiti	–	1	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–
Marshall Is.	–	2	–	–	–	–	2	–	–	–	–	2	–	–	–	–	1	1	–	–	–	2	–	–	–	–	–	–	–	–	–

0.677, and the number of lower jaw teeth, 0.686, and standard length were significant above the 99.5 percent level. The regression equation for the upper jaw was $Y=0.62769\ X+152.491$, and for the lower, $Y=0.43656\ X+95.149$, indicating thus that number of teeth does increase with increase in standard length.

DISTRIBUTION.—The known distribution of *A. fuscus* is given in figure 1. Literature records were included only if we were reasonably certain of the author's identification. The overall distribution, East Africa to Tahiti, is not an uncommon one for marine shorefishes of the Indo-West Pacific. Apparent absences of *A. f. fuscus* from Indian Ocean island groups such as the Seychelles are unexpected but may well be real. (J. E. Böhlke, et al., recently spent several months collecting fishes in the Seychelles Islands and failed to obtain specimens in habitats that would be expected to harbor *A. fuscus*). In the Pacific, *A. f. holomelas* appears to be restricted primarily to the southern island chain. The northern island chain (Marianas, Marshall, Phoenix, and Line Islands) have been collected frequently in recent years, and one would expect *A. f. holomelas* to have been collected there if present. (*A. fuscus* was reported from Saipan by Fowler, 1945, but this report was based on a misidentification.) Inasmuch as *A. f. holomelas* has not been collected otherwise from the northern island chain in recent years, we have some doubts as to the validity of the locality record for the two specimens from Boston Island, Marshall Islands. These are old specimens that were originally in the Musuem Godeffroy collections. Perhaps support for our doubts is to be found in the high total dorsal element counts of the two specimens, outside the range for Solomon Islands and New Hebrides specimens (nearest localities to Boston Island for which there are records). It is also possible, however, that the Boston Island specimens represent a newly established or relict population (if the species were more widely distributed in the past) that has tended to diverge as a result of isolation.

Much of the Pacific distribution of *A. f. holomelas* is peripheral in the sense discussed by Springer (1967).

HABITAT.—Springer collected *Atrosalarias* abundantly at One Tree Island, Great Barrier Reef. At that locality the species occurs at depths of less than a meter up to about three meters. It inhabits living or dead coral, most abundantly on the leeward side of the island. Relatively few specimens were taken on the windward side of that island. During the day at least, *A. f. holomelas* remained well hidden within the interstices of the coral, occasionally darting out and moving short distances to other positions in the coral. That the species is almost entirely black may indicate it is primarily a noctur-

FIGURE 1.—Distribution of *Atrosalarias fuscus*

● *A. f. fuscus:* examined specimens ○ *A. f. fuscus:* acceptable literature records ★ *A. f. holomelas:* examined specimens
☆ *A. f. holomelas:* acceptable literature records

nal form. One may collect specimens by removing and breaking up large chunks of "pie-crust" coral. Since the species also is collected easily with fish poisons, one would expect it to be taken readily in other localities.

RELATIONSHIPS.—*Atrosalarias* belongs to the subfamily Salariinae as defined by Norman (1943). Within that subfamily it appears to be most closely related to the genera *Salarias* Cuvier and *Negoscartes* Whitley. These genera are distinct from other Blenniidae in having some or all species with two epurals and no minimal hypural in the caudal fin and in having only two segmented rays in each pelvic fin. *Atrosalarias* differs from the other two genera in having fewer dorsal fin spines, more pectoral rays, and no branched rays in the caudal fin.

Superficially *A. fuscus* bears a close resemblance to *Ecsenius lividinalis* Chapman and Schultz (Fowler, 1927, reported on four specimens of *A. fuscus* from the Philippines, one of which is *E. lividinalis*). Aside from many osteological differences between *Atrosalarias* and *Ecsenius*, *E. lividinalis* can be distinguished from *A. fuscus* by its three segmented pelvic rays (one of these rays may not be visible externally), 12 dorsal spines, fewer than 15 segmented dorsal or anal rays, and a conspicuous black spot surrounding the anus.

NOMENCLATURE.—*Salarias ruficaudus* Ehrenberg was described from Massaua, Red Sea, same type-locality as for *A. fuscus*, without comparison with other species. No type material was designated, and none was found in the Paris Museum, where it would be expected. The description could apply to *A. fuscus* but might apply to some other species. We know of no other Red Sea blenny, however, that would fit the description as well.

Salarias niger Kossman and Räuber also was described from Massaua without comparison with either *A. fuscus* or *A. ruficaudus*. The author's figure clearly indicates *A. fuscus*. If type material is available, it is probably in the East Berlin museum.

Salarias phaiosoma Bleeker was described with mention of the possibility that it was a synonym of *S. fuscus*. Bleeker (1865) later recognized that his species was indeed a synonym of *S. fuscus*. The holotype apparently is lost.

MATERIAL (asterisks denote material not included in table 1 because of insufficient locality data).—

Astrosalarias fuscus fuscus.—RED SEA: HUI E60/120/II (1); Gulf of Aqaba: Eliat: HUI E60/96,14 (1), E60/93,3 (1); Strait of Jubal: USNM 200540 (1); Sarso: NMW 71362 (1); Kamaran Is.: BMNH 1937.4.26.14 (1); Massaua: BMNH 1871.4.13.48 (1), MCSN 12389 (1), SMF 1832 (2 syntypes); Nocra: HUI E62/1248 (1); Um Aabak: HUI E60/3660 F (5). INDIA: Sind: AMS B7994 (1). EAST AFRICA: Zanzibar: USNM 197639 (1). INDONESIA: RNH* 4782 (3); Sumatra: Pulo Bai, Batu Group: USNM 199482 (2); Mentawai Is.: USNM 199484 (3); Java: Djakarta Bay: UMMZ 144755 (2).

Astrosalarias fuscus holomelas.—South China Sea: Amboyna Cay: BMNH 1858.4.21.421. Philippine Is.: ANSP* 48648–50 (3); Sitankai: Scila Prov.: UMMZ 100295 (2); Sulu Is., BMNH 1933.3.11.709–710 (2), FMNH 47007 (1); Siluag Is.: UW 10276 (1), 10274 (9); Cebu: BMNH 1872.10.18.108 (holotype). Borneo: Pulo Bakkungaan Kechil: FMNH 51794 (2); Darvel Bay: USNM 200537 (2); USNM 201102 (1). Palau Is. [Pelew Is.]: BMNH 1874.11.19.71 (2), NMW 71366–67 (4), UW 9265 (1), ZSZM 2210 (1), 14043 (1); Kayangel Atoll, off Ngajangel Is.: SU 62084 (1); Anenptegel Is.: SU 62083 (4), 62085 (1). Timor: Kupang Bay: RNH 20300 (1). Banda Sea: NMW* 71361 (2); Banda Neira, Goenoeng Api: IRSN 2714 (10); Elpapoetih Bay: RNH 20251 (4). New Guinea: Geelvick Bay: MCSN 27208 (1); Netherlands Indies: USNM* 195721 (4). New Britain: Keraward Is.: USNM 200539. Solomon Is.: Russell Is.: AMS IB.6715–16 (2), IB.6720–22 (3); Vanikoro Is.: USNM 200538 (4); New Georgia: USNM 144290 (1); Tautsina Is.: USNM 200542 (2). Australia: Northern Territory, Gulf of Carpentaria, Yirrkalla: USNM 174329 (27); Western Australia, Abrolhos Is., Houtmans: WAM P4662 (1); Queensland (eastern Australia): USNM 176950 (1); Torres Strait, Murray Is.: AMS I.11794 (1), QMB I.4825 (1); Green Is.: USNM 177145 (1); Swain Reef: AMS IB.6201 (1); Northwest Is.: BMNH 1933.1.25.173–4 (2); Masthead Is.: AMS I.1424 (3); One Tree Is.: USNM 201251–6 (63); Heron Is.: LACM 8979–1 (6). New Hebrides: AMS I.14250–3 (8), ANSP 91588 (2); Vila Sandwich Is.: AMS I.6325 (1); Aneityum: ANSP 102190 (2). New Caledonia: Noumea: AMS IB.2259 (1). Fiji Is.: ANSP 87035 (1), FMNH 47767 (2), NMW 71363–5 (6), UH (uncataloged) R. H. Snider station no. F–1 (1). Tonga Is.: Tonga: AMS IA.5189 (1); Vavau: BMNH 1874.11.19.47 (1), 1876.5.1.31 (1). Tahiti: CAS 24044 (1). Marshall Is.: Boston Is. [Ebon Atoll]: ZSZM 766 (1), 2135 (1).

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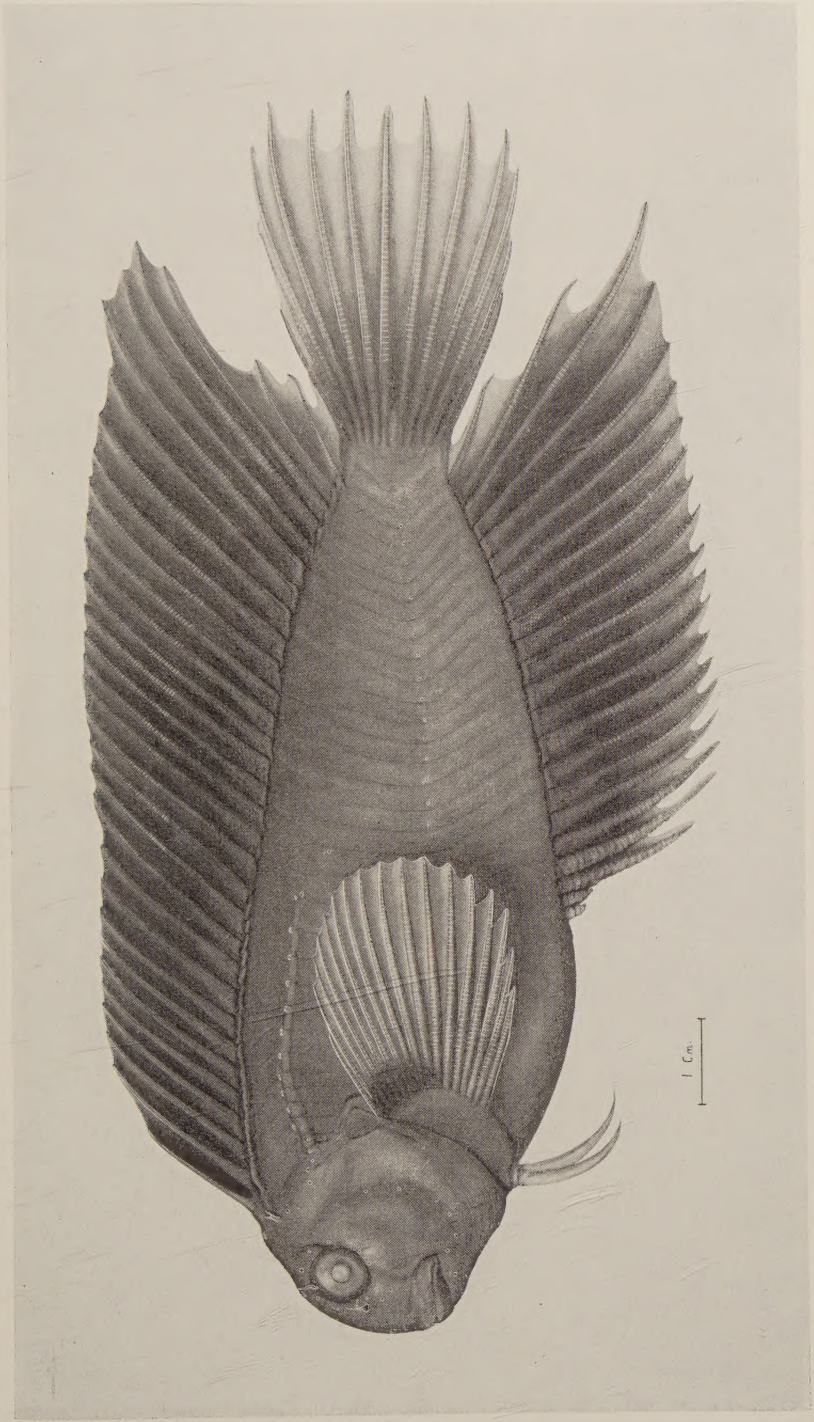

Arosalarias fuscus holomelas, USNM 174329, adult male 105 mm standard length, from Yirrkalla Gulf of Carpentaria, Northern Territory, Australia.